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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/678,696

10/02/2003

Hiroyuki Sakuyama

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EXAMINER

SMITH, JEFFREY S

ART UNIT

PAPER NUMBER

2635

DATE MAILED: 11/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/678,696

Applicant(s)

SAKUYAMA ET AL.

Examiner

Jeffrey S. Smith

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-52 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 5-8 and 29-52 is/are allowed.
- 6) ☐ Claim(s) 1-4 and 13-28 is/are rejected.
- 7) ☐ Claim(s) 9-12 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 10/02/03 and 9/01/06.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Specification

The disclosure is objected to because of the following informalities: In paragraph 3, "reproducing still encoded" should be "reproducing still encoded images."

Appropriate correction is required.

Claim Objections

Claim 9 is objected to because of the following informalities: In line 2, "performing the two-dimensional" should be "performing a two-dimensional." Also, in line 4 "performing a two-dimensional" should be "performing the two-dimensional." Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 6,847,736 issued to Itokawa ("Itokawa").

For claim 1, Itokawa discloses "a wavelet transform unit to perform a two-dimensional discrete wavelet transform of a level higher than or equal to level

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one on data of the non-interlaced image.” (See figure 1, which shows a frame DWT unit 102).

Claim 1 further recites “a determination unit to determine a movement speed of an object within the non-interlaced image based on at least values of wavelet coefficients of a 1LH sub-band of wavelet coefficients obtained by the wavelet transform unit.” An example of the “movement speed” that is determined in claim 1 is either a “high” speed or a “low” speed as described on page 20 of the application. These terms are relative terms that are general enough to include determining whether a movement speed is either zero or non-zero. For example, a speed can be zero, which is “low” compared to a speed greater than zero.

Itokawa discloses the “determination unit” as shown with the discrimination unit 104 of figure 1. The determination unit determines a movement speed of the non-interlaced image based on at least values of wavelet coefficients of the 1LH sub-band of wavelet coefficients. (See for example figures 3F and 4, and also column 13 lines 18-33. See also figure 7).

For claim 2, Itokawa discloses that the unit “determines the movement speed of the object within the non-interlaced image based on an amount of codes obtained by the coding.” (See for example column 2 lines 4-9, which states that the coding efficiency of a non-interlaced image is greater when the image does not move in the horizontal direction, as compared to when it does have movement. In other words, the amount of codes of the still image is less than the amount in a moving image).

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Claims 3 and 4 have the elements of claims 1 and 2 expressed as method steps and are rejected for the reasons given above.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 13-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Itokawa in view of U.S. Patent No. 6,359,928 issued to Wang et al. ("Wang").

For claim 13, Itokawa discloses "a data reduction unit to reduce an amount of the code data, wherein as a movement speed of an object in the non-interlaced image increases, wherein the data reduction unit decreases an amount to be reduced of part of the code data, the part of the code data affecting reproducibility of an edge part of the non-interlaced image." (See figures 30A, B, and C).

However, Itokawa does this by encoding an interlaced image. Itokawa does not disclose doing this by encoding the non-interlaced image.

Wang discloses encoding the non-interlaced image by decreasing an amount to be reduced of part of the code data affecting reproducibility of an edge part of the non-interlaced image. Wang does this by using multi-threshold DWT

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coding. (See column 1 lines 62-64, column 2 lines 45-62, and column 5 line 60 through column 6 line 50).

It would have been obvious to one of ordinary skill in this art at the time of invention to modify the non-interlaced frame DWT image compression device of Itokawa to include the multi-threshold DWT coding device of Wang because this allows the compression device to improve the quality of the reconstructed image by eliminating blocking artifacts as taught by Wang at column 2 lines 59-62.

For claim 14, Itokawa discloses decreasing "the amount to be reduced of part of the code data...affecting [the] comb-shaped image offset." (See figure 30C).

For claim 15, Wang discloses "the code data is generated by performing frequency conversion on the image data of the non-interlaced image (see figure 5, element 104 and column 5 lines 44-46), quantizing coefficients of each of the frequencies obtained by the frequency conversion (see element 110 of figure 5), and performing entropy coding (see element 112 of figure 5); and the data reduction unit reduces the amount of the code data by setting a quantization step employed in the quantization to a value larger than a standard value, and as the movement speed of the object in the non-interlaced image increases, reduces a value of the quantization step which value is employed in quantizing coefficients of a high-frequency band (see figure 6 and column 6 lines 25-49. As the speed of the object increases, the comb-shaped image offset in the non-interlaced image increases, which causes the quantization step size to decrease)."

For claims 16, 18 and 20, Wang discloses a two-dimensional wavelet transform. See figure 3.

For claims 17 and 19, Itokawa discloses discarding low order bit planes as shown in figure 20B and discussed at column 8 lines 22-32. Wang also discloses this feature as shown in figure 4 and discussed at column 5 lines 1-35.

Claims 21-28 have the elements of claims 13-20 expressed as method steps and are rejected for the reasons given above.

Allowable Subject Matter

Claims 5-8 and 29-52 are allowed. Claims 9-12 would be allowable if rewritten or amended to overcome the objections set forth in this Office action.

The following is a statement of reasons for the indication of allowable subject matter:

Claim 5 recites "a determination unit to divide wavelet coefficients of each of sub-bands obtained by the wavelet transform into blocks each having a pixel matrix smaller in size than each sub-band, and to determine a movement speed of an object within the non-interlaced image based on at least coefficient values of each block of a 1LH sub-band." This feature is not disclosed by the art of record. Independent claim 9 has a similar limitation and is therefore also allowable over the art of record for this reason.

Claim 29 recites an apparatus that divides frames of a moving interlaced image into one or more blocks and hierarchically compresses and encodes the frames by performing discrete wavelet transform. The apparatus includes "a

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sub-block motion estimation unit to estimate a motion in each of the sub-blocks based on the calculated amount of codes thereof." These elements are not disclosed in the art of record. Independent claims 37 and 45 include similar limitations and are therefore also allowable.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent No. 5,543,845 issued to Asamura et al. discloses an encoding apparatus that discriminates between moving and static images before performing compression.

The English language abstract for Japanese Patent No. JP02004350034A issued to Fukuhara et al. discloses an image encoding device that uses coefficients in the 1LH sub-band of a moving image to account for comb-shaped offsets during image compression.

The article by Vandendorpe et al. discloses a compression process that gives high vertical frequency subbands larger weights when an image has motion.

The article by Muramatsu et al. discloses a coding technique that reduces comb-shaped artifacts in Motion-JPEG 2000 images.

The article by Kuge uses a preprocessing method to counter comb-tooth artifacts in JPEG 2000 image coding.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey S. Smith whose telephone number is 571 270-1235. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marvin Lateef can be reached on 571 270-1245. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JSS


MARVIN LATEEF
SUPERVISORY PATENT EXAMINER

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